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ABSTRACT

The professional development of teachers is a crucial element of the nation's efforts to improve education. In recent years, these efforts have sought to foster high standards for teaching and learning for all of the nation's children, and almost all states have met federal requirements for developing challenging statewide content standards. However, children's learning will be transformed only if high standards are reflected in teachers' classroom practice. Education reforms will not succeed without teachers who are immersed in the subjects they teach and who know how to foster both basic knowledge and advanced thinking and problem solving among their students. The Eisenhower Professional Development Program, Title II of the Elementary and Secondary Education Act (ESEA), is the federal government's largest investment that is solely focused on developing the knowledge and skills of classroom teachers. This Executive Summary provides a synopsis of the second report of the National Evaluation of the Eisenhower Professional Development Program, Part B (State and Local Activities), a multi-year evaluation being conducted by the American Institutes for Research (AIR) under a contract with the U.S. Department of Education's Planning and Evaluation Service. The first report was based on six exploratory case studies of school districts conducted during the first months of the evaluation. This second report describes the current status of the program, based primarily on data from national probability samples of districts, SAHE grantees (i.e., the institutions of higher education and nonprofit organizations supported through the SAHE component of the program), and teachers, as well as on data from 10 in-depth case studies in 5 states. Contains 35 references. (Author/WRM)

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Executive Summary

Designing Effective Professional Development: Lessons from the Eisenhower Program

1999

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The National Evaluation of the Eisenhower Professional Development Program:
State and Local Activities

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DESIGNING EFFECTIVE PROFESSIONAL DEVELOPMENT: LESSONS FROM THE EISENHOWER PROGRAM

EXECUTIVE SUMMARY

October 1999

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For:

The U.S. Department of Education
Office of the Under Secretary

U.S. Department of Education
Richard W. Riley
Secretary

Office of the Under Secretary
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Under Secretary

Planning and Evaluation Service
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Director

December 1999

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EXECUTIVE SUMMARY
DESIGNING EFFECTIVE PROFESSIONAL DEVELOPMENT: LESSONS FROM THE EISENHOWER PROGRAM

The professional development of teachers is a crucial element of the nation's efforts to improve education. In recent years, these efforts have sought to foster high standards for teaching and learning for all of the nation's children, and almost all states have met federal requirements for developing challenging statewide content standards. Such standards seek a fundamental shift in what students learn. However, children's learning will be transformed only if high standards are reflected in teachers' classroom practice. Education reforms will not succeed without teachers who are immersed in the subjects they teach and who know how to foster both basic knowledge and advanced thinking and problem solving among their students.

The Program: The Eisenhower Professional Development Program, Title II of the Elementary and Secondary Education Act (ESEA), is the federal government's largest investment that is solely focused on developing the knowledge and skills of classroom teachers. The program is key to meeting the U.S. Department of Education's objective of ensuring that a "talented and dedicated teacher is in every classroom in America".[1] Part B of the Eisenhower Professional Development Program, with a 1999 appropriation of about $335 million, provides funds through state education agencies (SEAs) to school districts, and through state agencies for higher education (SAHEs) to institutions of higher education and nonprofit organizations. These funds primarily support professional development in mathematics and science.

The Evaluation Report: This is the second report of the National Evaluation of the Eisenhower Professional Development Program, Part B (State and Local Activities), a multi-year evaluation being conducted by the American Institutes for Research (AIR) under a contract with the U.S. Department of Education's Planning and Evaluation Service. The first report was based on six exploratory case studies of school districts conducted during the first months of the evaluation.[2] The purpose of that report was to obtain an initial description of the program and the issues that it faced in different local contexts. This second report describes the current status of the program, based primarily on data from national probability samples of districts, SAHE grantees (i.e., the institutions of higher education and nonprofit organizations supported through the SAHE component of the program), and teachers, as well as on data from 10 in-depth case studies in five states. The third report of the evaluation, to be issued in early 2000, will augment the results reported here with a longitudinal account of teachers' experiences in Eisenhower and other professional development activities and resulting changes in their teaching practices.

THE POLICY CONTEXT

In response to public concerns about education, state and local governments have taken steps to increase children's achievement in school. Many states and school districts have adopted rigorous content standards, as well as student performance standards, which describe the breadth and depth at which students should master content.[3] The federal government, too, has moved to support states in their development of content and student performance standards.

National, state, and local efforts to improve education are intended to create a fundamental shift in what students learn and how they are taught. The success of such ambitious education reform initiatives hinges, in large part, on the qualifications of teachers. However, while teachers generally support high standards for teaching and learning, many teachers are not prepared to implement teaching practices based on high standards.[4] Many teachers learned to teach using a model of teaching and learning that focuses heavily on memorizing facts, without also emphasizing deeper understanding of subject matter.[5]

As a result, teacher professional development is a major focus of systemic reform initiatives.[6] The need for high-quality professional development that focuses on subject-matter content and how students learn that content is all the more pressing in light of the many teachers who teach outside of their areas of specialization.[7] In 1998, 12 percent of science teachers of students in grades 7-12, and 18 percent of mathematics teachers in these grades, had neither a major nor a minor in their main teaching assignment.[8] This situation is especially true of teachers who teach at-risk students and those who teach in high-poverty schools. In 1998, teachers lacking a major in their primary assignment taught almost a quarter of the classes in high-poverty schools, compared to 14 percent of classes in low-poverty schools.[9]

The Eisenhower Professional Development Program, established in 1984 and reauthorized in 1988 and 1994, aims to support high-quality professional development to help teachers meet the demands of teaching to high standards. Yet, the 1988-89 evaluation of Eisenhower indicated that district-supported activities, which account for the vast majority of program funds, tended to be one-time in-service training events, averaging six hours in length.[10] The 1994 reauthorization intended to shift program-funded activities away from short-term professional development toward longer, more intensive activities.

THE EISENHOWER PROGRAM

The Eisenhower program was established in 1984, and reauthorized as Title II of the Elementary and Secondary Education Act, as amended by the Improving America's Schools Act (IASA) of 1994. The program allocates funds through states to school districts and to institutions of higher education or nonprofit organizations. In fiscal year 1999, $335 million was appropriated for Part B of the program, State and Local Activities. Eisenhower funds are distributed to states according to a formula that weights equally the number of children in the state between the ages of 5 and 17 and the state's allocation under Title I, Part A of the Elementary and Secondary Education Act.[11,12] Eighty-four percent of allocated Title II, Part B funds are distributed to SEAs, with the remaining 16 percent allocated to SAHEs. At least 90 percent of SEA allocations then flow through to local education agencies (LEAs), based on the same formula (equal weights to the school-aged population and the LEA's Title I, Part A allocation).[13] LEAs that receive Eisenhower grants under $10,000 are required to form consortia with other such LEAs, unless the SEA waives the requirement (Section 2204(b)). SAHEs distribute at least 95 percent of their Eisenhower allocations by competitive grants or contracts to institutions of higher education (IHEs) or nonprofit organizations (NPOs) that provide professional development to teachers or prospective teachers. Each SAHE develops priorities and guidelines for the awards based on the state plan for improvement in teaching and learning, which it develops collaboratively with the SEA (Section 2205(a)(2)(A)).

Like its predecessor, the Eisenhower Mathematics and Science Education Program, the reauthorized Eisenhower program focuses on the professional development of mathematics and

science teachers. The reauthorized legislation, however, allows states and districts to use funds in excess of $250 million to provide professional development to teachers in other core academic subject areas (Section 2206).[14] In its 1994 reauthorization of the program, Congress made it explicit that Eisenhower-assisted activities should be designed to improve teacher practice, especially for students who are most at risk of school failure.[15]

- **The Eisenhower program is designed to support high-quality professional development activities.** Both the Eisenhower legislation and the program guidance published by the Department of Education (ED) emphasize that the Eisenhower program should support high-quality professional development activities—professional development that is sustained, intensive, and continuing. According to the law, such professional development should reflect recent research on teaching and learning and should provide teachers and other school staff with the knowledge and skills necessary to provide all students with the opportunity to meet challenging standards.

- **The Eisenhower legislation encourages the use of funds to target teachers of at-risk students.** The 1994 legislation requires that state applications and local plans take into account the educational needs of students from historically underrepresented populations. The Eisenhower legislation places special emphasis on addressing the needs of teachers in schools receiving Title I, Part A funds; generally these are schools that have higher rates of poverty than other schools in their districts.

The reauthorized program includes a number of procedures designed to ensure the provision of high-quality professional development, including alignment with district and state standards and assessments, coordination (co-funding and working with schools and professional development providers), continuous improvement (use of indicators and needs assessments), and teacher participation in planning.

- **Districts and SAHE grantees are required to align their Eisenhower-assisted activities with state and local standards and reforms.** Recent efforts to improve education have focused on ensuring that all aspects of the education system—including curricula, assessments, teacher education—be consistent with one another and be geared toward the same goals. Reflecting this focus, the law requires the alignment of Eisenhower-assisted professional development activities with challenging state and local curriculum standards and student assessments.

- **The Eisenhower legislation requires the coordination of supported activities with education reform and professional development efforts funded by federal, state, and local governments and other public, private, and nonprofit organizations and associations.** Such integration of Eisenhower-assisted activities with other reform efforts would presumably strengthen the quality of those activities by gearing them to challenging standards and by allowing several funding sources to be combined to design higher quality activities. The law's requirements for district planning of professional development activities, for co-funding those activities with funds from other programs, and for IHE/NPOs working with schools, school districts, or consortia of districts, all promote linkages between Eisenhower-assisted activities and those funded from other sources.

- **The law encourages the use of continuous improvement strategies to plan and improve Eisenhower-assisted professional development activities, through careful goal-setting and monitoring.** The provisions are intended to foster purposeful planning and tracking of progress by states and localities, supported by state and district performance indicators, needs assessment, and evaluation.

- **The law also encourages teacher participation in decision-making about how to use funds from the Eisenhower program.** The law encourages districts to include teachers in developing both the state and local plans for professional development, which are required by the law, and the legislation also requires teachers' participation in district needs assessment.

Some of the key goals of the Eisenhower program are summarized in a set of performance indicators prepared by ED, as required by the Government Performance and Results Act (GPRA). This evaluation addresses four of ED's performance indicators for the Eisenhower program, which concern teachers' skills and classroom instruction, sustained professional development, high-quality professional development, and participation of teachers from high poverty schools.[16] In reporting the results of the evaluation, we use our data to describe how well the program is performing on each of the indicators.

THE NATIONAL EVALUATION OF THE EISENHOWER PROGRAM

The evaluation is based on three strands of data collection.

- **The National Profile.** This strand provides information about program goals, strategies, operations, and activities nationwide. During the 1997-98 school year, AIR conducted telephone interviews with a national probability sample of Eisenhower coordinators in 363 school districts and SAHE-grantee project directors in 92 institutions of higher education or nonprofit organizations (IHE/NPOs). We also collected data from a mail survey of a national probability sample of 1,027 teachers who participated in 657 Eisenhower-assisted activities.[17] We use these Teacher Activity Survey data to describe the types of professional development supported with Eisenhower funds and to compare activities sponsored by school districts to those sponsored by SAHE grantees.

- **The Case Studies.** This strand provides detailed information about how the Eisenhower program operates in selected states, school districts, and schools. During the 1997-98 school year, AIR conducted In-Depth Case Studies in 10 school districts—two school districts in each of five states: Kentucky, New York, Ohio, Texas, and Washington. Those case studies supplement six Exploratory Case districts visited during the first year of the evaluation.

- **The Longitudinal Study of Teacher Change.** This strand examines the effects of Eisenhower-assisted and other professional development on teaching practice in mathematics and science. In each of the 10 districts visited for the in-depth case studies, we interviewed and conducted classroom observations of teachers in three schools, for a total of 30 schools. We also surveyed all teachers who teach mathematics or science in those schools at three points in time, gathering detailed information about instruction during the 1996-97, 1997-98, and 1998-99 school years.

These multiple strands of data are designed to produce an integrated portrait of the Eisenhower program and are based on a variety of research methods and relying on data from groups of individuals who view Eisenhower-assisted activities from different vantage points. Data from our telephone interviews with district program coordinators and SAHE-grantee project directors, for example, are backed up by teacher-participant accounts of what they experienced. In addition, the survey results are cross-validated through case study data that are rich in potential to explain the quantitative results from the surveys. Finally, although our national data on the effects of participation in Eisenhower-assisted activities on change in teaching practice are based on teacher self-reports and do not provide direct estimates of change over time, data from the second and third waves of the longitudinal study, to be examined in the evaluation's third report, will provide additional information on teacher change.[18]

EFFECTIVENESS OF EISENHOWER-ASSISTED PROFESSIONAL DEVELOPMENT ACTIVITIES

To measure the effectiveness of Eisenhower-assisted professional development activities, we asked teachers to report on the extent to which participation enhanced their knowledge and skills in six domains: (1) in-depth knowledge of mathematics/science; (2) curriculum; (3) instructional methods; (4) approaches to assessment; (5) use of technology; and (6) approaches to diversity.

- **Overall, the results on effectiveness are mixed. When asked directly, many teachers in SAHE-grantee activities report that participation in Eisenhower-assisted professional development led to enhanced knowledge and skills and changes in their classroom teaching practice. Somewhat fewer teachers in districts report that participation in Eisenhower-assisted activities led to these positive teacher outcomes.** (See Exhibit ES.1.)

  ⇒ Forty-eight percent of teachers in district activities and 68 percent of teachers in SAHE-supported activities report enhanced in-depth knowledge of mathematics or science; and 63 percent of teachers in district activities and 79 percent of teachers in SAHE-supported activities report enhanced knowledge of instructional methods.

  ⇒ Percentages are lower for the use of technology and approaches to diversity. (About 24 percent of teachers in district activities and 50 percent in SAHE-grantee activities report enhanced knowledge and skills in technology; 26 percent in district activities and 35 percent in SAHE-grantee activities report enhanced knowledge and skills in approaches to diversity.)

  ⇒ SAHE-grantee activities meet ED's standard for changes in teachers' knowledge and skills (see box) in four of the six domains measured by the evaluation, and district activities meet this standard for two domains.

Indicator. **Teachers' Skills and Classroom Instruction.** By 1998, more than 50 percent of a sample of teachers will show evidence that participation in Eisenhower-assisted professional development has resulted in an improvement in their knowledge and skills, and by 2000, more than 60 percent will show such evidence. By 1999, more than 50 percent of a sample of teachers in selected sites will show evidence that participation in Eisenhower-assisted professional development has resulted in improved classroom

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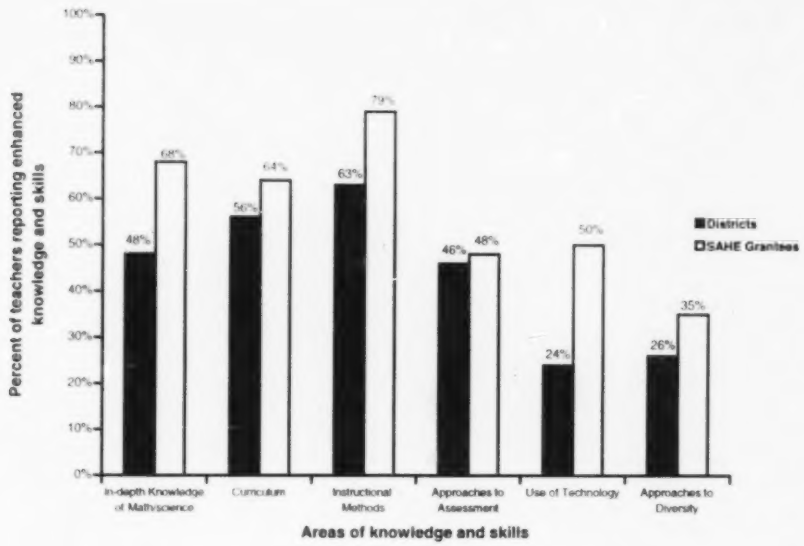
EXHIBIT ES.1

Percent of Teachers Reporting Enhanced Knowledge and Skills Due to Participation in Eisenhower-assisted Professional Development Activities (District n=731 to 750, SAHE Grantee n=233 to 240)



Source: Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.
How to read this exhibit: The first bar shows that 48 percent of the teachers who participated in district activities report their in-depth content knowledge and skills have been enhanced substantially as a result of professional development. Each bar and the number on the top of it represent the percent of teachers for each category.
Note: "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program. Due to difference in missing data across items, the district n ranges from 731 to 750; the SAHE Grantee n ranges from 233 to 240.

- **SAHE-grantee activities meet benchmarks for reported teacher outcomes set by other exemplary professional development programs.**

  ⇒ A comparison of our data for SAHE-grantee activities with the results obtained for 34 exemplary summer institutes in mathematics and science, supported by the National Science Foundation, the Department of Education, and other agencies, indicates that teachers participating in SAHE-grantee activities report enhancement of knowledge and skills in mathematics and science content roughly comparable to the results for the 34 exemplary activities.[19] Teachers participating in district Eisenhower activities show weaker results than do teachers in the 34 exemplary activities.

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THE QUALITY OF EISENHOWER-ASSISTED ACTIVITIES

We measured the quality of Eisenhower-assisted activities based on six features of best practice that were identified through a review of the available research on professional development and the opinions of expert practitioners:[20]

- the form or organization of the activity—that is, whether the activity is organized as a **reform type**, such as a study group, teacher network, mentoring relationship, committee or task force, internship, individual research project, or teacher research center, in contrast to a traditional workshop or conference;

- the **duration** of the activity, including the total number of contact hours that participants are expected to spend in the activity, as well as the span of time over which the activity takes place;

- the degree to which the activity emphasizes the **collective participation** of groups of teachers from the same school, department, or grade level, as opposed to the participation of individual teachers from many schools;

- the degree to which the activity has a **content focus**—that is, the degree to which the activity is focused on improving and deepening teachers' content knowledge in mathematics or science;

- the extent to which the activity offers opportunities for **active learning**—that is, opportunities for teachers to become actively engaged in the meaningful analysis of teaching and learning, for example, by reviewing student work or obtaining feedback on their teaching; and

- the degree to which the activity promotes **coherence** in teachers' professional development, by encouraging the continued professional communication among teachers, and by incorporating experiences that are consistent with teachers' goals and aligned with state standards and assessments.

- **Most Eisenhower-assisted activities are traditional in form, such as workshops, courses, or conferences. Relatively few Eisenhower-assisted activities are reform types of activities, such as study groups, networks, or mentoring relationships.**

  ⇒ About 79 percent of teachers in district activities are in traditional types of activities—primarily workshops and conferences. About 76 percent of teachers in SAHE-grantee activities are also in traditional activities—primarily workshops and college courses.

  ⇒ About 22 percent of teachers in district activities and 26 percent in SAHE-grantee activities are in reform activities, including teacher networks, study groups, mentoring, committees and task forces, internships, and resource centers.

- **On average, SAHE-grantee activities are of longer duration than district activities.**

  ⇒ The average amount of time teachers in district activities report spending in Eisenhower-assisted activities is 25 hours, compared to 51 hours for teachers in SAHE grantee activities. The average length of district activities, in hours, has approximately doubled since the last evaluation was conducted in 1988-89.[21]

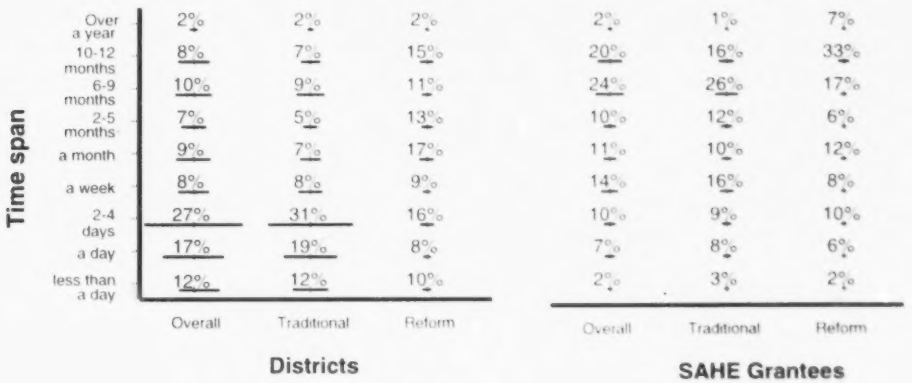
  ⇒ A higher percentage of SAHE-grantee activities than district activities span an extended period of time. For example, 46 percent of teachers in SAHE-grantee activities are in activities lasting at least six months, including 2 percent lasting more than one year, 20 percent lasting 10-12 months, and 24 percent lasting 6-9 months. (See Exhibit ES.2.) Twenty percent of teachers in district activities are in activities lasting at least six months.

  ⇒ ED's performance indicator for sustained professional development requires at least 35 percent of teachers to be in activities that extend over the school year. If "lasting at least six months" is used as the standard, then district activities do not yet meet the standard, while many SAHE-grantee activities exceed the standard by a substantial amount.[22]

> ***Indicator.*** **Sustained Professional Development.** By 1998, 35 percent of teachers participating in district-level Eisenhower-assisted activities will participate in activities that are a component of professional development that extends over the school year; by 2000, over 50 percent will.

EXHIBIT ES.2

Time Span of Eisenhower-assisted Activities, as Reported by Teachers (District n=766, SAHE Grantee n=244)



Source: Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998.
How to read this exhibit: The first column shows that 2 percent of the teachers who participated in district activities were engaged in the activity over more than a year. Each dot represents one teacher. If more than one teacher reported the same span, the teachers are displayed in a horizontal line with length proportional to the number of teachers. Each column represents the distribution for a particular group of teachers. The number on the top of each line is the percent of teachers participating in the corresponding time span.
Note: "Districts" refers to teachers who participated in Eisenhower-assisted activities provided through the district component of the program. "SAHE Grantees" refers to teachers who participated in Eisenhower-assisted activities supported through the SAHE component of the program.

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- **Relatively few district or SAHE-grantee activities emphasize the collective participation of teachers from the same department, grade level, or school. District activities give more emphasis to collective participation than do SAHE-grantee activities.**

  ⇒ Twenty percent of teachers in district Eisenhower-assisted activities report participating with other teachers in their department or grade level, compared to 7 percent of teachers in SAHE-grantee activities; and 19 percent of teachers in district activities report participating with all teachers in their school, compared to 11 percent of teachers in SAHE-grantee activities.

- **On average, SAHE-grantee activities give more emphasis than do district activities to the last three dimensions of quality—content focus, active learning, and coherence.**

  ⇒ Two thirds of teachers participating in SAHE-supported Eisenhower activities participate in activities that place a major emphasis on **content**, compared to fifty-one percent of teachers in district Eisenhower-assisted activities.

  ⇒ The percentage of teachers reporting a major emphasis on each of 18 separate indicators of **active learning** is higher for SAHE grantees than for districts, but relatively few teachers in either district or SAHE-grantee activities report some elements of active learning. For example, only 5 percent of teachers in district activities and 16 percent of teachers in SAHE-grantee activities report that their teaching was observed by the activity leader.

  ⇒ Teachers in both district and SAHE-grantee activities report that the activities have elements that promote **coherence** with other aspects of their professional experiences. For example, more than three quarters of teachers in both district and SAHE-grantee activities report that their activities are aligned with state and district standards. More teachers in SAHE-grantee than district activities, however, report that their Eisenhower activities built on prior professional development (39 percent compared to 31 percent) or were followed up with later activities (70 percent compared to 53 percent).

  ⇒ ED's performance indicator for high-quality professional development requires that at least 50 percent of teacher participants be in activities reflecting "best practice." The data collected by the evaluation show that district and SAHE-grantee activities meet this standard for some dimensions of high quality but not others. For example, as discussed above, more than 50 percent of teachers in SAHE-grantee and district Eisenhower activities are in activities that place a major emphasis on mathematics and science content, and thus ED's "best practice" standard for high quality is met. But districts do not meet the high quality standard for any of the characteristics of active learning, and SAHE grantees meet the standard for only a few characteristics of active learning.

> ***Indicator.*** **High Quality.** By 1998, more than 50 percent of teachers participating in district-level, Eisenhower-assisted professional development activities will participate in activities reflecting best practices, including a focus on continuous improvement. By 2000, more than 75 percent will.

- **There is enormous variability in the quality of Eisenhower-assisted activities; thus, some districts are providing the same kinds of high-quality professional development activities that SAHE grantees provide.**

  ⇒ For example, although many district activities are short, 2 percent of teachers in district activities are in activities spanning more than one year, 8 percent are in activities lasting 10-12 months, and 10 percent are in activities lasting 6-9 months. (See Exhibit ES.2.)

  ⇒ That some districts provide activities of extended duration, with collective participation, a major focus on content knowledge, a major emphasis on active learning, and coherence with teachers' other experiences, represents an "existence proof" that it is possible for districts to provide such activities.

  We do not know whether all districts possess the organizational capacity and staffing to provide high-quality professional development. Districts lacking the capacity to plan and implement high-quality professional development themselves may well be able to purchase it (e.g., from institutions of higher education), if they are aware of and insist upon the dimensions of quality we have identified.

- **The average differences in quality observed between district and SAHE-supported activities are associated with corresponding differences in cost.**

  ⇒ SAHE grantees spend more than twice as much per teacher participant as do districts. We estimate that SAHE grantees spend about $512 per participation, in comparison to $185 per participation for districts.[23]

  It is unclear why SAHE grantees spend more money per teacher participation than do districts. The competitive process of the SAHE grants may reward proposals that offer professional development with the six quality features, which are expensive to provide.[24] In addition, compared to SAHE grantees, districts may feel a responsibility to provide professional development to all of their teachers. This may push them in the direction of professional development with lower costs per participation.

- **Districts have met ED's standard for participation of teachers from high poverty schools, but there remains room for improvement (see box). SAHE grantees have not met ED's standard.**

  ⇒ Teacher participations in district Eisenhower-assisted activities are slightly more likely to be from high-poverty schools than are teachers in the national teaching force as a whole (23 percent compared to 21 percent).

  ⇒ Teacher participations in SAHE-grantee activities, however, are less likely to be from high-poverty schools than are teachers in the national teaching force (13 percent compared to 21 percent).

> *Indicator.* **High-poverty Schools.** The proportion of teachers participating in Eisenhower-assisted activities who teach in high-poverty schools will exceed the proportion of the national teacher pool who teach in high-poverty schools.

To some extent, the results for districts are encouraging: they indicate that the program has been somewhat successful at targeting resources on teachers of disadvantaged children. But the percentage of teachers from high-poverty schools served by the program is only modestly higher than the rate for the nation, indicating that more progress might be made in this area.

FEATURES OF PROFESSIONAL DEVELOPMENT THAT PROMOTE IMPROVEMENTS IN TEACHING

We used our national probability sample of teachers who participated in Eisenhower-assisted professional development to estimate the strength of the relationships among features of the professional development and self-reported teacher outcomes—enhanced knowledge and skills and changed teaching practice.

- **Activities with the six features of high quality—reform type, duration, collective participation, content focus, active learning, and coherence—promote better self-reported outcomes for teachers than other activities.**

  ⇒ The results provide empirical support for the contention that professional development that emphasizes content knowledge, active learning, and coherence leads to teachers reporting enhanced knowledge and skill and changes in teaching practices. (See Exhibit ES.3.)

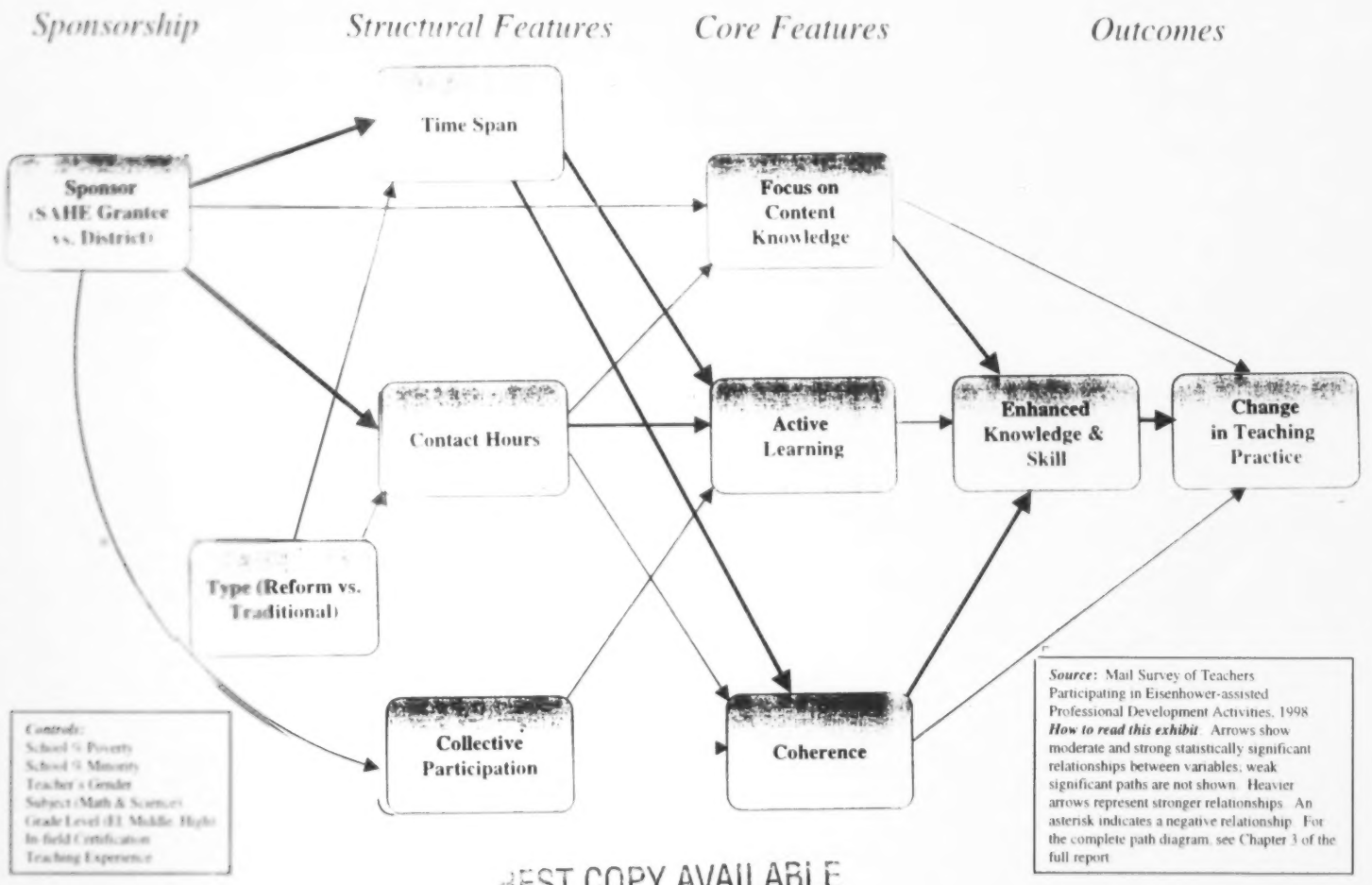
  ⇒ The results also show that activities of longer duration and activities that encourage collective participation of teachers tend to place more emphasis on content than other activities, provide more opportunities for active learning, and provide more coherent professional development. These features in turn promote positive teacher outcomes. *Thus, our results suggest that the emphasis in the legislation on sustained and intensive professional development is appropriate.*

  ⇒ As suggested in the literature on professional development, reform types of activities tend to produce more positive reported outcomes than traditional types, but our results indicate that this effect is largely indirect. That is, *reform activities tend to produce better outcomes primarily because they tend to be of longer duration.* Traditional and reform activities of the same duration tend to have the same effects on reported outcomes.

  ⇒ Our analyses show that *the difference between districts and SAHE grantees in reported enhancement of knowledge and skills and reported change in teaching practice is explained almost entirely by the fact that SAHE grantees place a greater emphasis upon duration, subject-matter content, active learning, and coherence.* In short, if districts placed a greater emphasis upon these characteristics, we hypothesize that teachers would report their knowledge and skill enhanced to the same extent as teachers in SAHE-supported activities, and that they would be just as likely to report changing their teaching practice.

EXHIBIT ES.3

THE RELATIONSHIP OF FEATURES OF PROFESSIONAL DEVELOPMENT TO TEACHER OUTCOMES


Sponsorship
Structural Features
Core Features
Outcomes
Time Span
Sponsor (SAHE Grantee vs. District)
Focus on Content Knowledge
Contact Hours
Active Learning
Enhanced Knowledge & Skill
Change in Teaching Practice
Type (Reform vs. Traditional)
Collective Participation
Coherence
Controls:
School % Poverty
School % Minority
Teacher's Gender
Subject (Math & Science)
Grade Level (El, Middle, High)
In-field Certification
Teaching Experience
Source: Mail Survey of Teachers Participating in Eisenhower-assisted Professional Development Activities, 1998
How to read this exhibit. Arrows show moderate and strong statistically significant relationships between variables; weak significant paths are not shown. Heavier arrows represent stronger relationships. An asterisk indicates a negative relationship. For the complete path diagram, see Chapter 3 of the full report.

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DISTRICT MANAGEMENT OF EISENHOWER-ASSISTED ACTIVITIES

We now turn from describing teachers' experiences in Eisenhower-assisted activities to a description of the ways that districts *manage and operate* their Eisenhower programs. Each district receiving Eisenhower funds generally uses the funds to support a collection of professional development activities. The collection of professional development activities that a district supports with Eisenhower funds can be viewed in its entirety as its "portfolio" of Eisenhower-assisted professional development activities. In our analysis, we examine the factors that influence the quality of the portfolios of professional development activities that districts offer and the extent to which districts engage in efforts to target teachers of high-need students.

The measures we use to characterize the quality of a district's portfolio of Eisenhower-assisted activities are: (1) the percent of the districts' participations in reform types of activities, (2) the average time span of activities (i.e., number of days, weeks, or months), (3) the number of opportunities for active learning in in-district workshops and institutes, and (4) the degree of collective participation in in-district workshops and institutes.[25]

In assessing district management and operations, we focus on the role of several provisions emphasized in the legislation: (1) the *coordination (co-funding)* of Eisenhower-assisted activities with other sources of funding for professional development; (2) the *alignment* of Eisenhower-assisted activities with state and district standards and assessments; (3) the *participation of teachers* and school-level staff in planning Eisenhower-assisted activities; and (4) the use of a process of *continuous improvement*, including monitoring progress against measurable objectives and performance indicators. (See page 4 for more detail on these provisions.)

- **Districts' use of co-funding, alignment, continuous improvement, and teacher involvement in planning leads to higher quality professional development. Thus, the requirements of the legislation concerning these provisions appear to be appropriate.**

  ⇒ Districts that engage in more co-funding of Eisenhower activities with other programs tend to support a greater proportion of reform types of activities than districts that engage in less co-funding, and they tend to provide more opportunities for collective participation.

  ⇒ In addition, districts that engage in more co-funding tend to engage in more extensive continuous improvement efforts and they tend to involve teachers more widely in planning, both of which are related to increased opportunities for active learning.

  ⇒ Districts that align professional development with standards and assessments are more likely to offer reform types of activities.

  ⇒ In addition, the districts that align professional development with standards and assessments are more likely than others to engage in continuous improvement, which is related to increased opportunities for active learning.

These results lead us to conclude that the intentions of the program concerning strategies such as co-funding, alignment, continuous improvement, and teacher involvement in planning are appropriate, in the sense that they lead to higher quality professional development.

- **Among districts where federal programs operate and support professional development, districts are more likely to co-fund with programs that have a mathematics and science focus than with other federal programs.**

  ⇒ For example, as Exhibit ES.4 shows, 44 percent of teachers are in districts with an NSF-funded State Systemic Initiative (SSI); of those, 67 percent are in districts where the SSI supports professional development; and of those, 66 percent are in districts where the Eisenhower project co-funds with the SSI. Among teachers in districts in which Title I, Part A operates and funds professional development, 50 percent are in districts where the Eisenhower project co-funds with Title I; proportions are smaller for other Department of Education programs.[26]

EXHIBIT ES.4

Percent of Teachers in Districts in Which Other Federal Programs Operate, Support Professional Development, and Co-fund with Eisenhower-assisted Activities (n=363)

Federal Program	Percent of teachers in districts where federal program operates in state or district	Percent of teachers in districts where federal program supports professional development in district	In districts where federal program operates and supports professional development, percent of teachers in districts that co-fund with other programs
National Science Foundation			
State Systemic Initiative	44	67	66
Urban Systemic Initiative	17	89	86
Rural Systemic Initiative	4	78	28
Local Systemic Change Initiative	12	91	76
Department of Education			
Title I, A (Disadvantaged)	91	91	50
Title I, C (Migrant Children)	40	63	35
Title III (Technology)	29	91	39
Title VI (Innovative Strategies)	77	73	48
Title VII (Bilingual)	47	82	28
Title IX (Indian)	19	57	5
IDEA (Disabilities)	77	85	22
Goals 2000	86	73	34
School-to-Work	77	85	28
Perkins (Vocational)	74	83	19

Source: Telephone Survey of District Eisenhower Coordinators, Spring 1998.
How to read this exhibit: Forty-four percent of teachers are in districts where coordinators report that a Statewide Systemic Initiative operated in their state in 1997. Of those, 67 percent funded professional development during 1997, and of those, 66 percent co-funded professional development with Eisenhower.

- **Most districts report that their Eisenhower-assisted professional development activities are aligned with standards and assessments.**

  ⇒ Alignment is more likely to be reported for *state* standards and assessments than it is for *district* standards and assessments, and more likely to be reported for mathematics than for science.

  ⇒ Alignment is more likely for standards than for assessments. For example, according to district coordinators, 85 percent of teachers are in districts where the Eisenhower professional development activities are aligned with district mathematics *standards*. In contrast, 69 percent of teachers are in districts where the Eisenhower professional development activities are aligned with district mathematics *assessments*.

  The greater alignment for standards than for assessments may reflect the fact that the Elementary and Secondary Education Act (ESEA) requirement of aligned assessments had not yet gone into effect at the time we collected our data.

- **Almost all teachers are in districts that report involving teachers in planning professional development.**

  ⇒ Ninety-nine percent of teachers are in districts that involve teachers in district-level planning of Eisenhower-assisted activities, and 62 percent are in districts in which teachers are involved in a formal school-level committee to plan professional development.

  These findings lead us to conclude that the provision of the law that supports teacher participation in planning is relatively well implemented. Still, our case study data reveal that the Eisenhower legislation's 80-20 rule, which calls for at least 80 percent of funds to be used "in a manner that is determined by. . . teachers and staff" and "to the extent practicable, takes place at the individual school site," is not well understood and is sometimes not even known to exist. In particular, it is not clear if the provision means that planning should involve teachers and occur at the school, or whether it is designed to encourage teacher involvement in district-level planning.

- **The use of performance indicators to guide the continuous improvement process is not yet widespread in districts that receive Eisenhower funds.**

  ⇒ Fewer than one in five teachers are in districts that collect data on performance indicators established to guide district professional development efforts.

  ⇒ Only one third of the teachers are in districts that have developed such indicators.

  ⇒ The majority of teachers are in districts whose Eisenhower coordinators are not aware that their state has performance indicators.

  Clearly, the development of state and district performance indicators is a goal of the program that is not generally being implemented, at least not yet. There are other ways in which districts show some commitment to continuous improvement. Needs assessments through teacher surveys and informal conversations are common. Nearly every district reports evaluating its professional development activities. These evaluations, however, are frequently based on teacher satisfaction

surveys or participation counts. It is less common to use observations of teachers' subsequent classroom practice to evaluate the effectiveness of Eisenhower professional development.

- **District efforts to target teachers of special populations of students have met with very limited success.**

  ⇒ Districts report a strong emphasis on recruiting teachers from high-poverty, low-achieving schools and slightly less emphasis on recruiting teachers from Title I schools.

  ⇒ Despite these reported efforts at targeting, and even though districts with larger numbers of high-poverty students receive more funding, teachers from high-poverty schools are only slightly more likely than others to participate in Eisenhower-funded activities.

  Although districts have met the Department of Education's standard for targeting (see page 10), current targeting strategies apparently have limited effectiveness. Perhaps these results are explained, in part, by the fact that most participants in Eisenhower-assisted activities are volunteers. It is possible that districts do not have adequate strategies to shape the incentives and constraints that determine which teachers volunteer.

- **Generally, larger districts are more likely to manage their portfolios better and to provide higher quality professional development than are smaller districts.**

  ⇒ Larger districts are more likely to align their professional development with standards and assessments, to co-fund their projects, and to have a greater commitment to continuous improvement; they also provide activities of longer duration, with more opportunities for collective participation and active learning.[27]

  Perhaps large districts have a better infrastructure and more capacity than small districts, which may enable them to provide higher quality professional development. Large districts also may have a greater variety of funding sources in addition to Eisenhower, increasing opportunities for co-funding, and perhaps creating a complexity that demands a commitment to continuous improvement.

SAHE-GRANTEE MANAGEMENT OF EISENHOWER-ASSISTED ACTIVITIES

SAHE grantees are subject to the same provisions for alignment, continuous improvement, and targeting that districts must follow. However, SAHE grantees also are subject to some additional requirements or guidelines. In particular, the 1994 reauthorization emphasizes the importance of coordination between SAHE grantees and districts in planning and providing professional development. Each SAHE grantee is required to enter into an agreement with one or more districts for the provision of professional development. Further, SAHE-grantee projects are shaped by the priorities and guidelines that the SAHE sets in structuring its competition for the Eisenhower awards.[28]

- **SAHE grantees' coordination with districts and continuous improvement efforts lead to higher quality professional development.**

  ⇒ SAHE grantees that coordinate more extensively with districts (e.g., use feedback mechanisms, support and extend district activities, co-fund and involve districts in planning, implementing and monitoring) provide professional development that spans longer amounts of time compared to SAHE grantees that engage in less coordination with districts.

  ⇒ Coordination with districts also has a positive effect on the use of strategies for continuous improvement, which, in turn, increases the active learning opportunities provided in SAHE-grantee activities.

  ⇒ Coordination also is related to greater targeting through its effect on continuous improvement.

  These results for coordination parallel those found for the district sample.

- **SAHE grantees report low levels of implementation of some types of coordination with districts but high levels of most continuous improvement strategies.**

  ⇒ SAHE grantees work closely with districts in several ways, such as communicating with district staff and using district needs assessments, but report low levels of other key components of coordination, such as co-funding and working with the Eisenhower coordinator.

  ⇒ SAHE grantees report moderately high levels of engagement in most continuous improvement efforts, such as using state indicators, conducting needs assessments and evaluations; few SAHE grantees, however, use district indicators in designing their Eisenhower activities.

  These findings suggest that, although the average quality of SAHE-grantee activities is high on some dimensions (e.g., duration and content focus), quality could be further improved by strengthening the coordination between SAHE grantees and districts and giving more emphasis to district indicators.

- **On average, SAHE grantee projects in education departments offer higher-quality activities on several dimensions than projects in mathematics/science departments.**

  ⇒ Education departments sponsor professional development activities that last more than twice the number of hours and span a longer time period than activities sponsored by mathematics/science departments.

  ⇒ Education departments engage in more types of coordination with the districts from which they draw their teachers, and they place more emphasis on continuous improvement than do mathematics/science departments.

⇒ Education department projects are especially strong when housed in research/doctoral universities, where they are more likely to put a strong focus on content and provide numerous opportunities for active learning.

The superiority of professional development provided through education departments, in contrast with mathematics/science departments, may be due to the fact that education departments have greater expertise in student and teacher learning of subject matter, as well as experience in coordinating with practitioners. Faculty in these departments are the main contributors to the literature on effective professional development in mathematics and science. Projects in mathematics/science departments, on the other hand, have a strong content focus. Others have noted that, in the training of teachers, quality might be enhanced by better collaboration between educators and scientists. Apparently, the same can be said for continuing teacher education in the form of Eisenhower professional development. Each type of department brings unique strengths to designing and delivering professional development that could be complementary in meaningful collaboration.

IMPLICATIONS FOR PROFESSIONAL DEVELOPMENT

These findings of the National Evaluation of the Eisenhower Professional Development Program have a number of implications for professional development generally and for future Eisenhower legislation and program operations specifically.

First, the program should seek ways to encourage the use of all features of professional development that are related to teacher knowledge and skills, and change in practice. The program should continue emphasizing "sustained and intensive" professional development activities. More specifically, this evaluation suggests that professional development should focus on deepening teachers' *content knowledge* and knowledge of how students learn particular content, on providing opportunities for *active learning*, and on encouraging *coherence* in teachers' professional development experiences. Eisenhower professional development should pursue these goals using activities of greater *duration* and *collective participation*. Clearly, there is considerable room to increase the frequency of these attributes of effective professional development in both district and SAHE-grantee activities. While *reform* professional development is more effective than *traditional* professional development, the advantage to reform activities is explained primarily by greater duration.

Second, the program should develop additional approaches to targeting teachers in high-poverty schools. While increasing the participation of teachers in high-poverty schools is an important goal of the legislation, current approaches to targeting these teachers are insufficient to achieve this goal.

Third, federal indicators might be improved by specifying more clearly the dimensions of high-quality professional development, focusing on annual improvements rather than absolute levels, and setting higher standards. The federal indicators are not as directive as they might be in specifying the dimensions of high-quality professional development. Our analyses suggest that the federal indicators should guide local practice toward greater emphasis upon content knowledge, active learning, and coherence, and that districts should pursue these attributes of professional development through offering activities of greater duration and with more emphasis

upon collective participation. In addition, several of the federal indicators are stated in terms of absolute levels to be achieved by a specified date (e.g., "at least 50 percent of teachers"). It would be better to have indicators stated in terms of the amount of improvement needed annually, until an acceptably high level of performance is reached. Finally, the federal indicators set some standards that are too low. For example, in targeting teachers from high-poverty schools, the standard is simply to exceed the national average. Furthermore, in the targeting indicator, participation in Eisenhower professional development is stated as a dichotomous variable (participate or not), while clearly teachers participate in Eisenhower-supported professional development in varying amounts and types.

Fourth, the program should pay attention to building district capacity to foster continuous improvement efforts. If using data to make decisions is to be a serious endeavor, then districts may need assistance in determining the types of data that would be useful and in interpreting them. We believe local evaluation can be done in ways much stronger than current practice, which relies heavily upon participation counts and teacher satisfaction surveys. We recommend that local evaluation of professional development focus on instruction, by assessing the degree to which the professional development is characterized by well-implemented attributes of high-quality professional development: a focus on content, active learning, and coherence, delivered with sufficient duration and collective participation. Such evaluations might be based on a variety of sources of data, including well-designed surveys of participating teachers, and the observation of teachers to assess the extent to which they have made appropriate changes in their instruction. Although the assessment of student achievement might be used as part of a balanced evaluation of professional development, we suggest that local evaluation efforts should not focus on assessing the effects of professional development on student achievement. There are simply too many intervening variables between professional development experiences and subsequent gains in student achievement to make such studies feasible at the local level. Further, collecting and analyzing high-quality data on gains in student achievement is expensive and requires technical skills that may not be present at the local level. Clearly, there needs to be more research that looks at the relationships between features of professional development and gains in student achievement, but this is better done as a part of well-designed major research studies.

Fifth, more information is needed on the characteristics and conditions that give some districts the capacity to provide high-quality professional development. We have speculated that districts could provide the same types of professional development as do SAHE grantees. There are existence proofs of districts doing exactly that. What we do not know from our analyses is the percentage of districts that have the capacity to provide such professional development. Our analyses indicate that larger districts have greater capacity and, to some extent, so do high-poverty districts. This larger capacity may be explained, in part, by their larger district staff and, in part, by their greater Eisenhower funds. Consortia that tie together several small districts into one unit for providing Eisenhower professional development also seem, on average, more effective than small districts. The issue of district capacity is one that should be closely monitored in future research.

Sixth, districts could increase the quality of the professional development they provide by focusing their Eisenhower money on a small number of teachers, rather than spreading it across a large number of teachers. Not surprisingly, high-quality professional development costs more per participant than does lower quality professional development. Districts may feel a greater responsibility to reach a large number of teachers than do SAHE grantees, and this is reflected in the cost per participant. The question is, should districts continue to spread the money from the Eisenhower program across as many teachers as possible? Or, should they focus the money on a

small number of teachers, so that they can provide higher quality, more influential professional development? Our results suggest the money should be focused. This recommendation also interacts with the finding about targeting. More effective targeting might, at the same time, provide a rationale for more focused expenditures.

Seventh, one reason that SAHE-grantee professional development is, on average, of higher quality than district professional development may be that SAHE grantees have to compete for funds. We do not know as much about these SAHE-sponsored competitions as we would like. We find that the majority of SAHE grantees have been receiving Eisenhower support for several years. Still, in all cases, IHE/NPOs interested in Eisenhower support must develop a proposal and have it judged worthy of funding. In contrast, districts receive money from the state educational agency on a formula basis, with no competition. Perhaps having districts compete for funds would push them toward higher quality professional development.

Eighth, there is considerable evidence that, on average, education departments in institutions of higher education provide higher quality professional development than do mathematics and science departments. The one exception is that mathematics/science departments in non-research/doctoral institutions focus more on content knowledge than do education departments. We do not have empirical data on interdepartmental collaboration, but, in our case studies, we did not see much evidence of these two types of departments collaborating and combining their expertise to provide high-quality professional development. Lack of collaboration between education and mathematics/science departments is a well-recognized problem in preservice teacher education and may be an issue for in-service education, as well.

Ninth, SAHE-grantee projects should be engaging in higher levels of coordination with districts, as called for in the legislation. The evaluation shows that such coordination is related to the provision of high-quality professional development. Therefore, more attention might be paid to supporting and developing opportunities for SAHE grantees to coordinate and work with districts in mutually beneficial ways—ways that allow grantees to exercise their expertise in developing professional development projects while benefiting from district expertise in serving the needs of their teachers and students.

Finally, the evaluation supports the importance of programs that fund professional development activities within specified subject areas. During the past 15 years, the Eisenhower Professional Development Program has provided continuous support for professional development activities for mathematics and science. This evaluation highlights the importance of the content focus of professional development activities and the role that the Eisenhower program has played in building capacity in these two subjects in school districts. Generic professional development that focuses on teaching techniques without a content focus does not appear to be effective. If the Congress is considering expanding the program, it should consider creating analogous programs in other academic subject areas, rather than eliminating the content focus on mathematics and science.

[1] U.S. Department of Education, (1999c). *FY 2000 Annual plan: Volume 2. Program performance plans.* Washington, DC: Author.

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[3] American Federation of Teachers. (n.d.). *Principles for professional development.* Washington, DC: Author.; Blank, R. F., & Pechman, E. M. (1995, May). *State curriculum frameworks in mathematics and science: How are they changing across states?* Washington, DC: Council of Chief State School Officers; National Educational Goals Panel. (1995). *The national education goals report: Building a nation of learners.* Washington, DC: Author; Porter, A., Archibald, D. A., & Tyree, A. K. (1991). Reforming the curriculum: Will empowerment policies replace control? In S. H. Fuhrman & B. Malen (Eds.), *The politics of curriculum and testing: The 1990 yearbook of the Politics of Education Association* (pp. 11-36). Bristol, PA: Falmer Press; Porter, A. C., Smithson, J., & Osthoff, E. (1994). *Standard setting as a strategy for upgrading high school mathematics and science, in the governance of curriculum.* Alexandria, VA: Association for Supervision and Curriculum Development.

[4] Cohen, D. K. (1990). A revolution in one classroom: The case of Mrs. Oublier. *Educational Evaluation and Policy Analysis, 12*(3), 311-329; Elmore, R. F. & Burney, D. (1996, March). *Staff development and instructional improvement: Community District 2, New York City.* Philadelphia: Consortium for Policy Research in Education; Elmore, R. F., Peterson, P. L., & McCarthey, S. J. (1996). *Restructuring in the classroom: Teaching, learning, & school organization.* San Francisco: Jossey-Bass; Grant, S. G., Peterson, P. L., & Shojgreen-Downer, A. (1996). Learning to teach mathematics in the context of systemic reform. *American Educational Research Journal, 33*(2), 502-541; Muncey, D. E., & McQuillan, P. J. (1996). *Reform and resistance in schools and classrooms: An ethnographic view of the Coalition of Essential Schools.* New Haven: Yale University Press; Sizer, T. R. (1992). *Horace's school: Redesigning the American high school.* Boston: Houghton Mifflin.

[5] Cohen, D. K., McLaughlin, M. W., & Talbert, J. E. (Eds.). (1993). *Teaching for understanding: Challenges for policy and practice.* San Francisco: Jossey-Bass; Darling-Hammond, L., & McLaughlin, M. W. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan, 76*(8), 597-604; Porter, A. C., & Brophy, J. E. (1988). Good teaching: Insights from the work of the Institute for Research on Teaching. *Educational Leadership, 45*(8), 75-84.

[6] Corcoran, T. B., Shields, P. M., & Zucker, A. A. (1998, March). *Evaluation of NSF's Statewide Systemic Initiatives (SSI) Program: The SSIs and professional development for teachers.* Menlo Park, CA: SRI International.

[7] National Commission on Teaching & America's Future. (1996, September). *What matters most: Teaching for America's future.* New York: Author.

[8] U.S. Department of Education, National Center for Education Statistics. (1999). *Teacher quality: A report on the preparation and qualifications of public school teachers* (NCES 1999-080). Washington, DC: Author.

[9] U.S. Department of Education, National Center for Education Statistics. (1999). *Teacher quality: A report on the preparation and qualifications of public school teachers* (NCES 1999-080). Washington, DC: Author.

[10] Knapp, M. S., Zucker, A. A., Adelman, N. E., & St. John, M. (1991, February). *The Eisenhower Mathematics and Science Education Program: An enabling resource for reform (summary report).* Menlo Park, CA: SRI International.

[11] Part B allocates funds to the 50 states, the District of Columbia, Puerto Rico, the Bureau of Indian Affairs (BIA), and the outlying areas.

[12] Title I of the Elementary and Secondary Education Act, as amended by the Improving America's Schools Act, is the federal government's largest investment in K-12 education. In FY 1997, Part A of the program, the local educational agency grants program, was appropriated at $6.27 billion. Most of these funds are distributed by formula, based on the number of children who live in poverty, first to states and then to districts. Established in 1965 as one of the cornerstones of President Johnson's War on Poverty, Title I funds educational services for children attending high-poverty schools. With its 1994 reauthorization of the program, Congress made clear its intention that services provided under Title I be linked to high state and local standards.

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[13] Up to 5 percent of the SEA's Title II grant may be used for program administration, and another 5 percent may be used to support professional development activities provided at the state level.

[14] There are two ways that Eisenhower funds can be used to support professional development in other subject areas. First, when the appropriation for the program exceeds $250 million, the additional funds can be used to provide professional development in core subject areas other than mathematics and science. Second, the ESEA legislation allows states and districts to apply to the federal government for waivers that allow them to devote larger percentages of their Eisenhower Professional Development Program grants to other core subject areas.

[15] The term "Eisenhower-assisted activities" reflects the fact that district Eisenhower funds can support professional development activities in a number of ways. Eisenhower funds may be used to support all costs associated with activities, provided that these activities are allowed in the legislation (see Section 2210). Alternatively Eisenhower funds may pay for only some of the allowable costs associated with an activity. This is a common occurrence, because the legislation encourages cost sharing of Eisenhower-assisted professional development activities with those funded by other programs (Section 2209).

[16] This evaluation did not address ED's two performance indicators that address state-level operations of the Eisenhower program, or the performance indicator pertaining to alignment.

[17] Our descriptions of the nature and quality of professional development provided through the Eisenhower program are based on national probability samples with excellent response rates. The national probability sample of district programs and SAHE grantees has an 88 percent response rate for district program coordinators and 87 percent for SAHE grantees. The national probability sample of teachers who participated in Eisenhower professional development activities has a response rate of 72 percent. The 72 percent response rate is especially high when considering the multistage process necessary to complete the sample. District coordinators and project directors in SAHE-grantee institutions had to submit the complete list of professional development activities provided during the prior year and the number of participants. Two activities were selected from each district with probability in proportion to size, and from those, complete rosters of teachers were collected from which two teachers were randomly selected and surveyed.

[18] We also took a number of steps to maximize the validity and reliability of the evaluation's national survey data. For example, most of the survey questions ask teachers and administrators to provide an accounting of behaviors, not direct judgments of quality that might be more likely to be biased. The substantial variation in the responses teachers and district administrators provided to these behavioral items, as well as the consistency in teacher and district administrator responses, tends to bolster our confidence in the validity of the data.

[19] See Carey, N., & Frechtling, J. (1997, March). *Best practice in action: Follow-up survey on teacher enhancement programs*. Arlington, VA: National Science Foundation. Carey and Frechtling indicate that 44 percent of participants in outstanding teacher development programs reported that the programs enhanced their knowledge and understanding of science content to "a great extent" (value of 5 on their 5-point scale). If we isolate the percentage of participants in SAHE-grantee activities who reported that the activity enhanced their mathematics or science knowledge "to a great extent" (value of 5 on the 5-point scale), the percentage is 41 percent. The comparable percent for district activities is 24 percent.

[20] During the past decade, a considerable literature has emerged on professional development, teacher learning, and teacher change (Corcoran, T. B. (1995). *Transforming professional development for teachers: A guide for state policymakers*. Washington, DC: National Governors' Association; Darling-Hammond, L. (1995). Changing conceptions of teaching and teacher development. *Teacher Education Quarterly, 22*(4), 9-26; Hargreaves, A., & Fullan, M. G. (1992). *Understanding teacher development*. London: Cassell. Hiebert, J. (1999). Relationships between research and the NCTM standards. *Journal for Research in Mathematics Education, 30*(1), 3-19; Lieberman, A. (Ed.). (1996). Practices that support teacher development: Transforming conceptions of professional learning. In M. W. McLaughlin & I. Oberman (Eds.), *Teacher learning: New policies, new practices*. New York: Teachers College Press, 185-201; Little, J. W. (1993). Teachers' professional development in a climate of educational reform. *Educational Evaluation and Policy Analysis, 15*(2), 129-151; Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press; Richardson, V. (Ed.). (1994). *Teacher change and the staff development process: A case in reading instruction*. New York: Teachers College; Sparks, D., & Loucks-Horsley, S. (1989). Five models of staff development for teachers. *Journal of Staff Development, 10*(4), 40-57; Stiles, K., Loucks-Horsley,

S., & Hewson, P. (1996, May). Principles of effective professional development for mathematics and science education: A synthesis of standards, *NISE Brief* (Vol. 1). Madison, WI: National Institutes for Science Education). The research literature contains a mix of large- and small-scale studies, including intensive case studies of classroom teaching, evaluations of programs designed to improve teaching and learning, and surveys of teachers about their preservice and in-service preparation and in-service professional development experiences. In addition, there is a large body of literature describing "best practices" in professional development, drawing on expert experiences. Despite the size of the literature, however, relatively little systematic research has been conducted on the *effects* of professional development on improvements in teaching or on student outcomes, and very little research has been conducted on the relative effects of *alternative forms* of professional development. The research that has been conducted, however, along with the experience of expert practitioners, does provide some preliminary guidance about the characteristics of high-quality professional development (See, in particular, Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press). In particular, several recent studies suggest that professional development that focuses on specific mathematics and science content and the ways students learn such content is especially helpful (Cohen, D. K., & Hill, H. C. (1998). *Instructional policy and classroom performance: The mathematics reform in California* (RR-39). Philadelphia: Consortium for Policy Research in Education; Kennedy, M. M. (1998). *Form and substance in in-service teacher education* (Research monograph no. 13). Arlington, VA: National Science Foundation). We integrated and operationalized the ideas in the literature on "best practices" in professional development to create a set of measures or scales describing the six features of Eisenhower-assisted activities described in the text.

[21] The 1988-99 evaluation collected data on duration from districts rather than teachers, so a comparison of results from the 1988-89 and the current evaluation should be interpreted as providing an indication of the general magnitude of the change rather than a precise numerical estimate. See Knapp, M. S., Zucker, A. A., Adelman, N. E., & St. John, M. (1991, February). *The Eisenhower Mathematics and Science Education Program: An enabling resource for reform (summary report)*. Menlo Park, CA: SRI International, p. 109.

[22] The indicator requires that activities "are a component of professional development that extends over the school year." It is possible that some short-term Eisenhower activities are linked to other activities, and these "sequences" of activities extend over the school year. If so, the percent of Eisenhower-assisted activities extending more than six months may understate the percent of activities that "are a component of professional development that extends over the school year." On our teacher survey, we asked whether the Eisenhower-assisted activities were followed up with additional activities that built upon earlier work; 59 percent of teachers in district activities and 70 percent of teachers in SAHE-grantee activities reported that the Eisenhower-assisted activities in which they participated were followed up with additional activities. We have no information on the duration of the follow-up activities, but assumed that some of the follow-up activities might extend over the school year.

[23] A "participation" is a teacher participant in an Eisenhower-assisted activity. Teachers who participate in more than one activity are counted separately for each activity in which they participate. The dollar per participation figure for districts includes federal Eisenhower dollars only and does not include the 33 percent matching requirement.

[24] We were not able to conduct a systematic analysis of SAHE competitions.

[25] The data from our national sample of teachers show that each of these dimensions is related, either indirectly or directly, to improvements in teachers' knowledge and skills and changes in teaching practice; thus, we consider each of these dimensions as an indicator of high-quality professional development, whether it has a direct effect on teacher outcomes, or operates indirectly (e.g., a reform approach affects teacher outcomes indirectly through its effect on duration).

[26] We have no information on the scope of co-funding (e.g., the amount of money contributed by a particular program in a cost-sharing arrangement).

[27] Throughout our analyses of district data, we tested to see where patterns of Eisenhower support for professional development differ significantly according to the district poverty level or the size of the district. All of our analyses simultaneously control for size and poverty, so any effects are independent of one another. We also tested for the interaction between these two variables.

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[28] Relative to SEAs, SAHEs have a smaller number of grantees, and thus may be able to monitor their grantees' projects to help ensure the implementation of quality activities. However, we did not examine the SAHE's monitoring role.

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